Claims

1. A method in the surface sizing of a paper or board web, in which method surface size, such as a starch solution, is applied by means of an applicator device (1, 11, 1a, 1b) to at least one side of the web (W) to be surface sized, and in which surface sizing is performed per one side of said web (W) in one or more stages, **characterized** in that in connection with the application of surface size a pressure effect is applied to the web (W) by subjecting the web (W) to an underpressure and/or to an overpressure such that, by means of said pressure effect, surface size is forced to penetrate into the web (W) into the pores of the web.

2. A method as claimed in claim 1, **characterized** in that an underpressure is created in the pores of the web (W), which underpressure sucks surface size applied to the surface of the web from the surface of the web (W) into the pores in the inner layers.

3. A method as claimed in claim 2, **characterized** in that surface size is applied to a first side (W_1) of the web and that a vacuum effect is applied to the opposite, i.e. a second side (W_2), of the web (W) to cause air to flow through the web (W) such that surface size moves from the first side (W_1) of the web in the direction of the second side (W_2) of the web into the web (W).

4. A method as claimed in claim 3, **characterized** in that the application of surface size per one side of the web (W) is performed in one or more successive stages.

5. A method as claimed in claim 3 or 4, **characterized** in that the vacuum effect is applied to the web (W) in one or more successive stages.

6. A method as claimed in any one of claims 2 to 5, **characterized** in that the application of surface size to the web (W) is started before the web (W) is subjected to the effect of vacuum.

7. A method as claimed in claim 6, **characterized** in that the surface size is applied to the web (W) in its entirety before the vacuum effect is applied to the web (W).

8. A method as claimed in claim 6, **characterized** in that at least one layer of surface size is applied to the web (W) before the web (W) is subjected to the effect of vacuum and that, after that, at least one further layer of surface size is applied to the web (W) while the web is subjected to the effect of vacuum.

9. A method as claimed in any one of claims 2 to 5, **characterized** in that the web (W) is subjected to the effect of vacuum before the application of surface size to the web (W) is started and that the vacuum effect is continued after the point of application of surface size.

10. A method as claimed in claim 2, **characterized** in that surface size is applied to a first side (W_1) of the web and that a vacuum effect is applied to the same, i.e. the first side (W_1), of the web (W).

11. A method as claimed in claim 10, **characterized** in that the vacuum effect is applied to the web (W) before the application of surface size to the web (W) is started.

12. A method as claimed in claim 10 or 11, **characterized** in that the application of surface size to the web (W) is started immediately when the application of the vacuum effect to the web (W) is stopped.

13. A method as claimed in any one of claims 10 to 12, **characterized** in that in order to keep the web (W) balanced, a vacuum effect is also applied to the web on the opposite, i.e. a second side (W_2), of the web.

14. A method as claimed in any one of claims 10 to 13, **characterized** in that after the application of surface size an overpressure effect is applied to the web (W) to force surface size into the pores of the web (W).

15. A method as claimed in any one of the preceding claims, **characterized** in that the web (W) is surface sized on both sides in successive stages and the absorption of surface size into the pores of the web is enhanced by means of a pressure effect on both sides of the web (W).

16. A method as claimed in any one of the preceding claims, **characterized** in that the penetration of surface size into the web (W) is controlled by controlling the pressure effect applied to the web.

17. A method as claimed in any one of the preceding claims, **characterized** in that the vacuum level applied to the web (W) is controlled and maintained in a range of 5 – 80 kPa.

18. A method as claimed in any one of the preceding claims, **characterized** in that the vacuum level applied to the web (W) is controlled and maintained in a range of 5 – 40 kPa.

19. A method as claimed in any one of the preceding claims, **characterized** in that the two-sidedness of the web (W) is controlled by means of the vacuum applied to the web.

20. A method as claimed in claim 5, **characterized** in that the web (W) is dried between the surface sizing of the different sides (W_1, W_2) of the web (W).

21. An apparatus in the surface sizing of a paper or board web, which apparatus has been arranged to apply surface size, such as a starch solution, by means of an applicator device (1, 11, 1a, 1b) in one or more stages to at least one side of the web (W) to be surface sized, **characterized** in that the apparatus comprises applicator devices (1, 11, 1a) for applying surface size to the web and devices for applying an underpressure and/or an overpressure to the web (W) and for forcing surface size to penetrate into the web (W) into the pores of the web.

22. An apparatus as claimed in claim 21, **characterized** in that the apparatus comprises vacuum devices for creating an underpressure in the pores of the web (W) to suck surface size applied to the surface of the web from the surface of the web (W) into the pores in the inner layers.

23. An apparatus as claimed in claim 22, **characterized** in that the vacuum devices have been arranged to create a vacuum effect on the web (W) on the side of the web opposite to the side to which surface size is applied to cause air to flow through the web (W) and to transfer surface size from a first side (W_1) of the web in the direction of a second side (W_2) of the web into the web (W).

24. An apparatus as claimed in claim 23, **characterized** in that the applicator devices have been arranged such the application of surface size per one side of the web (W) is performed in one or more successive stages.

25. An apparatus as claimed in any one of claims 21 to 24, **characterized** in that the applicator devices and the vacuum devices have been arranged successively in the running direction of the web (W) such that the vacuum effect created by the vacuum devices begins only after the application of surface size accomplished by the applicator devices.

26. An apparatus as claimed in any one of claims 21 to 24, **characterized** in that the vacuum devices have been arranged with respect to the applicator devices such that the vacuum effect created by the vacuum devices on the web (W) begins at least simultaneously with the size application point where the application of surface size is performed by the applicator devices.

27. An apparatus as claimed in any one of claims 21 to 26, **characterized** in that the vacuum devices have been arranged with respect to the applicator devices such that the application point of surface size is situated in the area of the vacuum effect.

28. An apparatus as claimed in any one of claims 21 to 27, **characterized** in that the vacuum created by the vacuum devices is controllable.

29. An apparatus as claimed in any one of claims 21 to 28, **characterized** in that the vacuum devices comprise a suction roll.

30. An apparatus as claimed in claim 29, **characterized** in that the suction roll has been provided with a suction zone which forms an area of the vacuum effect.

31. An apparatus as claimed in any one of claims 21 to 28, **characterized** in that the vacuum device is a suction box.

32. An apparatus as claimed in any one of claims 21 to 28, **characterized** in that the vacuum device is a vacuum shoe.

33. An apparatus as claimed in any one of claims 21 to 32, **characterized** in that the applicator devices comprise a contact-free applicator device, in particular a spray coater.

34. An apparatus as claimed in any one of claims 21 to 32, **characterized** in that the applicator device is a film sizing device.